

NOTES ON AUSTRALIAN LYCAENIDAE. PART VIII.

ON OGYRIS ZOSINE HEW. AND O. GENOVEVA HEW.

By G. A. WATERHOUSE, D.Sc., B.E., F.R.E.S.

[Read 27th August, 1941.]

Sufficient evidence is now available to show that the above names represent two distinct species and not, as has been thought for a long time, the male and female respectively of the same species. A list of the principal references is given.

Hewitson, 1854, described and figured both species, giving no more precise locality than Australia. In 1862 he figured the underside of a specimen from the British Museum as the female of *zosine*. This specimen is a male of *genoveva*. In 1863, he still considered this specimen as a female. Kirby, 1879, in his list of the Hewitson Collection, states it contained one *zosine* and two *genoveva*. In 1936 I saw in London every specimen of the two species mentioned by Hewitson; these are now all in the British Museum.

Miskin, 1883, under the name *O. genoveva*, described and figured male and female with a purple variety of the female. Unfortunately he did not state if both female forms were taken in both the localities he mentions. This is the first time any suggestion was made that either of these species had two female forms.

Bethune-Baker, 1905, revised the genus *Ogyris* and described two new races of *zosine* and said the type form came from Townsville and was more sombre in colouring than specimens from the south. He figured the male genitalia without stating the locality of his specimen, but his figure appears to be the genitalia of a Townsville specimen.

Waterhouse & Lyell, 1914, mis-spelt the name "*zozine*", described two new races and gave evidence that the types of both species came from Brisbane.

Bethune-Baker, 1916, replied to our remarks and endeavoured to show we were in error. He made several statements as to what Hewitson had done which cannot be substantiated from Hewitson's papers nor the specimens. As I had not then seen the holotypes nor the attached labels, which Bethune-Baker did not quote, I did not reply.

Tindale, 1923, agreed with what we had published in 1914, gave some good figures and described another race. He almost came upon the truth as he figured a second form of the male from Brisbane. This was the true *zosine*.

The position, prior to 1935, on which every one seemed to agree was, following Miskin, 1883, that we had a species with a dimorphic female and that *zosine* and *genoveva* were male and female of the same species. Then in May, 1935, Mr. L. Franzen told me he considered there were two distinct species at Brisbane. He had always found small dark purple males and purple females in the one batch of larvae and pupae and never the large violet-purple male and the blue-green female associated with them. He convinced me that he was correct. At that time I had very few specimens from the Brisbane district; he, however, gave me material to take to London in 1936 to compare with the holotypes in the British Museum.

An examination of the holotype male *zosine* and the holotype female *genoveva* showed that both had a Hewitson label "Austl. Strang.". Knowing Hewitson's habit of always abbreviating, this can only mean that they were from Frederick Strange, who reached England in 1852 with a large natural history collection for sale, including many butterflies. Strange did not collect many miles north of Moreton Bay (Brisbane), and there are other specimens in the Hewitson Collection with the same label which could only have come from Brisbane. Both holotypes agree better with Brisbane specimens I

had with me than with those from many other localities. Indeed, except for age they could be considered identical. I am satisfied that my previous conclusion (1914) that both types came from Brisbane was correct. In 1852 the British Museum purchased from Strange twenty-two Lepidoptera from Moreton Bay, including a male *zosine*. The fixing of Townsville as the type locality of *zosine* by Bethune-Baker, 1905, was not based on any logical grounds. Townsville males are very much paler than the holotype and it is doubtful if there was any settlement or even collecting north of Moreton Bay before Queensland was made a separate colony in 1859.

I was pleased to find that the *Ogyris* in the British Museum were arranged according to my views and not those of Bethune-Baker. Mr. N. D. Riley went through his paper with me and agreed that several of his statements were without any justification, and that I was correct in considering the holotypes had come from Brisbane.

I returned from England convinced that the two species were distinct. I made a careful examination of the numerous specimens in my collection at the Australian Museum and in the collections of my friends in order to get the ranges of both and assign to each species the race names that had been given. I examined the male genitalia and although I found differences, I could not at first reconcile them. It seemed that at Townsville both species occurred. Two females, a blue and a dull purple, were well known from there, but only the dull purple male. This male was obviously a race of *zosine* from Brisbane. The genitalia also confirmed this. On making a further close examination of Townsville specimens and comparing them with those from other localities, I found a character that I should have noticed before. All the females from Townsville, both blue and purple, had their hindwings more drawn out towards the anal angle and were distinctly narrower than any female from the southern States. I then made a series of measurements of the hindwings at right angles and reduced these to a common basis, with the result that all Townsville females agreed with Brisbane purple females and not with females of *genoveva*. This showed that all Townsville specimens were *zosine* and there it had two forms of female. I had thought previously that *genoveva* had the two forms of female. When I now see the specimens in the cabinets I wonder why this character was not seen earlier.

Dr. C. P. Ledward and Miss Smales have made a careful investigation into the life-histories of the two species at Burleigh Heads, S.Qd. The larvae are slightly different and are attended by different species of *Camponotus*. The larvae and pupae of *zosine* are not found in the ants' nests, but under stones, bark, in tree cracks or in curled leaves on the ground. The larvae and pupae of *genoveva* are always found in the ants' nests, usually underground and the empty pupal shells are torn to pieces by the ants. The pupae of *zosine* are duller black with abdomen slightly mottled, more noticeable after emergence, empty shells being often found. The pupae of *genoveva* are uniformly black.

The hooks of the genitalia are sharply bent in *zosine* while those of *genoveva* are bent in an even curve. The clasps also show differences.

As far as is at present known *zosine* is a coastal species from Richmond River, N.S.W., to Cooktown; also at Port Darwin. The exception is specimens taken at Clermont, Qd., by Mr. E. J. Dumigan. The other species *genoveva* has not yet been found on the coast north of Brisbane, but is found in the Main Divide as far north as Duaringa. It is a coastal and inland species in New South Wales, Victoria and South Australia.

These are a very interesting pair of similar species which overlap, as far as is known, only over a short part of their range. It now becomes necessary to sort out the various subspecific names that have been given to the two species. There are other pairs of similar species that overlap such as *Trapezites iacchus* and *T. eliena*, which by some are considered the same species, but here the overlap is much greater.

OGYRIS ZOSINE Hewitson, 1854.

The holotype is a male in the British Museum and, as I have shown, from Brisbane. Like most Brisbane males, it is small and dark purple. The figure of Hewitson is good. The specimen from the British Museum Collection figured by Hewitson in 1862 as the female is a male *genoveva*. In 1863 he still considered this a female. Kirby, 1879,

gives one *zosine* in the collection, i.e., the holotype. Therefore Bethune-Baker, 1916, was wrong when he said Hewitson associated the purple female with it. This purple female in the collection was never mentioned by Hewitson and was placed in the No. 1 position over the name *genoveva*, the holotype female being in the No. 2 position. This accounts for the two Hewitson specimens mentioned by Kirby. I have little doubt that Hewitson considered this purple female as the male of *genoveva*.

The typical race is found from Ballina, N.S.W., to Brisbane. The males are dark purple. All females so far are bright rich purple, and the pale spot of the forewing is not so large as in *genoveva* from the same district. The female is figured by Miskin, 1883, as *genoveva*, var. a. A synonym of the female is *zenobia* Waterh. and Lyell, 1914. Both sexes are figured by Tindale, 1923, p. 346, text-figs. A and B. The female is figured, Waterhouse, 1932, Pl. xxv, 1B. The ants attending the larvae at Burleigh Heads are *Camponotus claripes* Mayr.

The race from the north is *typhon* Waterh. and Lyell, 1914. The holotype is in the Australian Museum with blue female and purple female (*iberia*) all from Townsville. Thanks to the late F. P. Dodd this race is well represented in collections. The male is much duller purple than that from Brisbane. Of twenty females from Townsville before me, fourteen are blue of varying shades and six are dull purple. The pale spot of forewing is smaller. It is figured, Waterh. and Lyell, 1914, fig. 403 ♂, 425 ♀ blue, 420 ♀ purple (*iberia*) and Tindale, 1923, Pl. xxix, fig. 15 blue, fig. 14 purple. Males from Mackay, Clermont, Herbert River, Cooktown and Port Darwin are all very similar to those from Townsville, but those from Cairns are darker purple. Of females I have seen fewer specimens, one blue from Mackay, three blue and one purple from Clermont, three blue from Cooktown and six blue from Darwin. From near Cairns I know of twenty dark purple females and only one blue. This latter is a darker blue than those I have from Townsville. It seems that blue females are commoner in drier areas and purple in wetter ones. More females are required from localities in Queensland.

O. ZOSINE ZOLIVIA, n. subsp. This is a remarkably large race caught and bred by Mr. T. H. Guthrie on Hayman and Whitsunday Islands, Qd. in March and April, 1935. All the specimens are much larger than those from other localities. The male above is dark purple, not so deep as in *zosine* nor so dull as in *typhon*, and has broad black margins; beneath it is paler than in *zosine* but not so pale as in *typhon*. The female above is black with restricted purple basal areas and the paler cream spot of forewing is between veins 3 and 6. Beneath mottled as in the other races. Mr. Guthrie took a number of specimens and all the females were purple as well as those he saw flying. I caught a purple female on Lindeman I. and saw another.

OGYRIS GENOVEVA Hewitson, 1854.

The holotype is a female in the British Museum and, as I have shown above, from Brisbane. Hewitson's figure is fairly good, but he describes the colour as silvery-blue and figures it with a greenish tint which agrees better with the holotype. In 1862 he recorded another female and figured the underside of a male as the female of his *zosine*. Both specimens were received at the British Museum at the same time in 1857, from Moreton Bay. Kirby, 1879, gives two *genoveva* in the Hewitson Collection. No. 1 is the purple female which Hewitson never mentioned and which, I believe, he considered the male of *genoveva*. No. 2 is the holotype.

The male is quite a different colour to *zosine* above, having a decided violet tint of varying degrees. The female has much broader hindwings. The basal colour has a varying greenish tint according to the angle at which it is viewed. I have never seen a specimen approaching the pale silvery-blue of Townsville females of *zosine*. The extent of colour on the hindwing is very variable. There may be two spots of colour on either side of veins 2, 3 and 4 near the termen; these spots may be joined to the basal area by colour along the veins and reach their greatest extent in the holotype female of the race *splendida*. The cream spot of forewing is wider than in *zosine*.

The eggs are laid on *Loranthus* or in a crack or under bark on the host tree some distance from the *Loranthus*. I suggest that when the young larvae hatch, they are taken by the ants to their food or may even be taken to the nests and there fed by the ants. It is remarkable how often as many as forty larvae and pupae are found in the

one ants' nest. Probably the ants collect the young larvae from several trees and bring them to the one nest. When the larvae are older they are guided to and from their food by the ants, which in south Queensland and New South Wales are usually *Camponotus nigriceps*. The pupae are uniformly dull black and after emergence the pupal shells are torn to pieces by the ants. This explains why pupal shells of this species are so rarely found.

This species does not show as much geographical variation as *zosine*. The chief differences above in the males are the different tints of violet-purple and the width of the dark margins. In the females the cream patch of the forewing becomes wider and longer as we come from north to south and there is an increase of basal colour. However, when the following races are seen together in the cabinet the distinctions are more apparent.

The typical race is from Brisbane, where some very large specimens have been bred. To these Bethune-Baker, 1905, gave the unnecessary name *magna*. Waterhouse and Lyell, 1914, figs. 398 ♀ and 407 ♂ undersides are from specimens marked *magna* by Bethune-Baker at the time he wrote his paper. Besides the information on the label of the holotype, females from Brisbane I took to London agreed better with it than those from any other locality.

The male above is rich dark violet and has the dark margins narrower than the other races. The female has the basal areas bluish-green and sometimes there are spots near the termen of hindwing. The cream spot of forewing extends from vein 7 to below 3 on the upperside, but to 2 on the underside. This race seems to be rarer than formerly and is known from Brisbane to Burleigh Heads. The female is figured as *zosine* by Tindale, 1923, Pl. xxix, fig. 13. A comparison of this figure with figs. 14 and 15 of *O. zosine typhon* on the same plate shows at once the difference in shape of the two species.

O. GENOVEVA DUARINGA Bethune-Baker, 1905. This race is slightly smaller than the above. The male is paler violet with narrow margins. The female has the basal areas much bluer than the other races and the cream spot extends from 7 to below 3 on the upperside and to 2 on the underside. The blue of the hindwings sometimes extends along veins 2, 3 and 4 almost to join spots on either side of these veins close to the termen. In one specimen the colour is almost as extensive as in the holotype *splendida*.

This race was described from a long series in the Tring Museum from near Duaringa, Qd., amongst which are no purple females. Thanks to the late Lord Rothschild, two pairs of the series are before me and there are others in Australia from the same locality. The male and female are figured by Miskin, 1883, but his figure of var. a is the purple female of *zosine* probably from Brisbane. Specimens from near Milmerran bred by Mr. J. Macqueen have most females with a decided blue tint and belong here.

O. GENOVEVA GELA, n. subsp. This is the New South Wales race, typically from St. Mary's, near Sydney, where before the trees were cut down I bred it in considerable numbers. The male is smaller than *genoveva*, brighter in colour and the dark margins are broader. In the female the basal areas are greener and not very extensive, spots near the termen of hindwing being rarely present. The cream spot of forewing is broad and extends from vein 7 nearly to 2 on the upperside and to 2 on the underside, and above 7 there is sometimes a whitish bar. It is figured as *araxes* male, Waterh. and Lyell, 1914, fig. 428. I am including here specimens from near Scone and Murrurundi as well as those from several Sydney localities.

O. GENOVEVA ARAXES Waterh. and Lyell, 1914. This is the Victorian race typically from Dimboola. It is a still smaller race. The male is a different paler shade of violet purple and the margins are broader. The female is greenish-blue and the colour is not very extensive. The cream spot is broad, extending from above vein 7 to 2 above and to 2 below with a white bar above 7. The spot is not so deeply indented inwardly as in the northern races. Specimens from Horsham agree with this as no doubt do those from near Melbourne, which I have not yet seen.

O. GENOVEVA GENUA, n. subsp. This is the race found in the Mt. Lofty Ranges near Adelaide. The specimens are somewhat larger than the previous race. The male has the dark margins broader than the previous race and the general colour is darker, more like specimens from New South Wales. The female has the bluish-green more restricted.

The cream patch is broad and of an even width, inwardly almost straight. It extends from above vein 7 to 2 where in most cases it is sharply cut off; on the underside it also extends to 2 and almost to the costa where it is white.

O. GENOVEVA SPLENDIDA Tindale, 1923. This was described from a single female from Mt. Painter, Flinders Range, S. Australia. In this the metallic-blue areas are much increased, especially on the hindwing, where the colour reaches the termen enclosing three irregularly defined black spots in 3, 4 and 5. There is also a small streak of colour in 7 of the forewing. Mr. Mules has a somewhat similar female from Cradock, which is close to the Flinders Range. It is smaller and the metallic areas are not so extensive, but it has a few metallic scales near the apex of the forewing.

In addition to those who have sent me specimens as mentioned, I have to thank Mr. J. Macqueen, Dr. Ledward and Miss Smales for many important notes.

Literature Cited.

- BETHUNE-BAKER, G. T., 1905.—*Trans. Ent. Soc. London*, p. 269.
———, 1916.—*Ann. Mag. Nat. Hist.*, (8) xvii, p. 386.
HEWITSON, W. C., 1854.—*Exotic Butterflies*, 1, p. 95, pl. 48.
———, 1862.—*Catalogue Lycaenidae British Museum*, p. 2.
———, 1863.—*Illustrations Diurnal Lepidoptera, Lycaenidae*, p. 3.
KIRBY, W. F., 1879.—*Catalogue Hewitson Collection Diurnal Lepidoptera*, p. 144.
MISKIN, W. H., 1883.—*Trans. Ent. Soc. London*, p. 343, pl. xv.
TINDALE, N. B., 1923.—*Trans. Roy. Soc. S. Aust.*, xlvii, p. 344.
WATERHOUSE, G. A., 1932.—*What Butterfly is That?*, p. 176.
———, and LYELL, G., 1914.—*Butterflies of Australia*, p. 115.
-